

Claims:

1. A photocurable dental restorative comprising (i) 100 parts by weight of a polymerizable monomer, (ii) 0.01 to 5 parts by weight of a photopolymerization initiator of acylphosphine oxide, and (iii) 200 to 1900 parts by weight of an inorganic filler, wherein the inorganic filler (iii) is a mixed filler of:

- 10 (A) irregular-shaped inorganic particles having an average particle size of not smaller than $0.1\ \mu\text{m}$ but smaller than $1\ \mu\text{m}$;
 (B) spherical inorganic particles having an average primary particle size of not smaller than $0.1\ \mu\text{m}$ but not larger than $5\ \mu\text{m}$; and
 15 (C) fine inorganic particles having an average primary particle size of not larger than $0.1\ \mu\text{m}$;
 which are so blended as to satisfy the following mass ratios ① to ③:

- 20 ① $m_A/(m_B + m_C) = 0.2 \text{ to } 3$
 ② $m_B/(m_B + m_C) = 0.5 \text{ to } 0.99$
 ③ $m_C/(m_B + m_C) = 0.01 \text{ to } 0.5$

where m_A , m_B and m_C are masses of the inorganic particles (A) to (C).

2. A photocurable dental restorative according to claim 1, wherein said mixed filler (iii) is obtained by so blending the inorganic particles (A) to (C) as to satisfy the following mass ratios ①' to ③';

- 30 ①' $m_A/(m_B + m_C) = 0.4 \text{ to } 2.3$
 ②' $m_B/(m_B + m_C) = 0.6 \text{ to } 0.9$
 ③' $m_C/(m_B + m_C) = 0.1 \text{ to } 0.4$.

3. A photocurable dental restorative according to claim 1, wherein in said mixed filler (iii), a maximum size of aggregates of primary particles of the spherical inorganic particles (B) and a maximum size of aggregates of primary particles of the fine inorganic particles (C)

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are not larger than 20 μm , respectively, and a total amount of the aggregates thereof is not larger than 20% by volume of the whole mixed filler (iii).

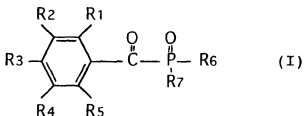
4. A photocurable dental restorative according to claim 1, wherein said spherical inorganic particles (B) have an average primary particle size of not larger than 1 μm .

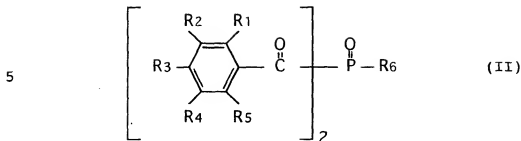
5. A photocurable dental restorative according to claim 1, wherein said fine inorganic particles (C) have an average primary particle size of from 0.05 to 0.09 μm .

6. A photocurable dental restorative according to claim 1, wherein said mixed filler (iii) has a volume of the pores of not smaller than 0.08 μm due to strongly aggregated particles of not larger than 0.1 cc/g.

7. A photocurable dental restorative according to claim 1, wherein said mixed filler (iii) has at least one distribution peak at a position of a particle size of not larger than 0.1 μm and at a position of a particle size of not smaller than 0.1 μm but not larger than 1 μm , respectively, on particle size distribution based on the volume of particles, but has no distribution peak at a position of a particle size in excess of 5 μm .

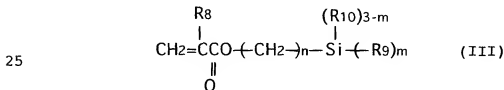
8. A photocurable dental restorative according to claim 1, wherein said acylphosphine oxide is represented by the following general formula (I) or (II):





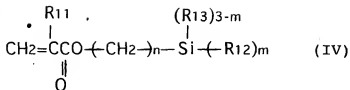
10 wherein each of R_1 , R_2 , R_3 , R_4 and R_5 is any one of the groups selected from the group consisting of a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, an alkylthio group, and a substituted or unsubstituted aryl group, and each of R_6 and R_7 is any one of the groups selected from the group consisting of a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkenyl group, and a substituted or unsubstituted aryl group.

15 9. A photocurable dental restorative according to claim 1, wherein said irregular-shaped inorganic particles
20 (A) are treated for their surfaces with a silane coupling agent represented by the following general formula (III),



30 wherein R_8 is a hydrogen atom or a methyl group, R_9 is an alkoxy group, a chlorine atom or an isocyanate group, R_{10} is an alkyl group having 1 to 6 carbon atoms, m is an integer of 2 to 3, and n is an integer of 8 to 20,

and said fine inorganic particles (C) are treated for their surfaces with a silane coupling agent represented by
35 the following general formula (IV),



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wherein R_{11} is a hydrogen atom or a methyl group, R_{12} is an alkoxy group, a chlorine atom or an isocyanate group, R_{13} is an alkyl group having 1 to 6 carbon atoms, m is an integer of 2 to 3, and n is an integer of 2 to 3.

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10. A photocurable dental restorative according to claim 1, wherein an amine compound is contained in an amount of from 0.01 to 5 parts by weight per 100 parts by weight of the polymerizable monomer (i).

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11. A method of producing a photocurable dental restorative by preparing an inorganic filler by mixing:

(A) irregular-shaped inorganic particles having an average particle size of not smaller than $0.1 \mu\text{m}$ but smaller than $1 \mu\text{m}$;

(B) spherical inorganic particles having an average primary particle size of not smaller than $0.1 \mu\text{m}$ but not larger than $5 \mu\text{m}$; and

(C) fine inorganic particles having an average primary particle size of not larger than $0.1 \mu\text{m}$;

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so as to satisfy the following mass ratios ① to ③:

- ① $\text{mA}/(\text{mB} + \text{mC}) = 0.2 \text{ to } 3$
- ② $\text{mB}/(\text{mB} + \text{mC}) = 0.5 \text{ to } 0.99$
- ③ $\text{mC}/(\text{mB} + \text{mC}) = 0.01 \text{ to } 0.5$

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where mA , mB and mC are masses of the inorganic particles (A) to (C),

and by mixing 100 parts by weight of a polymerizable monomer, 0.01 to 5 parts by weight of a photopolymerization initiator of acylphosphine oxide, and 200 to 1900 parts by weight of said inorganic filler.

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